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PERFORMANCE MEASURES FOR MANUFACTURING INDUSTRIES IN INDIA: A CASE STUDY ANALYSIS

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ABSTRACT

The global competition in twenty-first century presents a challenging and dynamic workplace environment where Quality, Productivity & Safety parameters along with other related parameters is being continuously redefined. Hence, there is a need for identifying the challenges in manufacturing industries for their performance improvement. The purpose of this paper is to develop, analyse & validate a model for performance measures by developing an instrument for facilitating the implementation process in manufacturing industries in India. Survey methodology is being used for data collection. The identified measures were subjected to appropriate statistical tests to establish reliability & validity. After an exhaustive study, 6 performance measures were identified for analysis. The validated instrument developed may be used in manufacturing industries for performance improvements.

KEYWORDS: Manufacturing Industries, Performance Measures, Quality & Productivity & Safety

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Original Article

1. INTRODUCTION

In the revolution of global market, Competitiveness is a driving force. Survival has become very difficult now days. Performance measurement is the need of every organization to judge the situation of their business. There are various attributes for measuring the performance like customer satisfaction, human resource, safety & quality culture change, quality of product, financial performance impact, operating performance impact, safety performance impact etc.

Possibilities to integrate Quality, Productivity& Safety are also of increasing topical interest now days. This research has been undertaken, to know the current status of quality, productivity & safety tools and techniques being adopted by Indian Manufacturing Industry, to identify the performance measures of quality, productivity & safety improvement in manufacturing industry and also capture the measures to be taken in the journey to excellence for Indian Manufacturing Industry. The aim of this study is to design an instrument relating to Performance Measures & critically examining how these factors have linkages with the factors that affect organizational performances.

This paper is organized as follows: section 2 discusses challenges faced by Indian manufacturing Industries, section 3 discusses related works for identification of performance measures, section 4 discusses the methodology adopted, section 5 discusses the study and analysis done on data, section 6 discusses interpretation of

CSFs & finally section 7 concludes the study.

2. CHALLENGES OF INDIAN MANUFACTURING INDUSTRIES

TQM is applied world over for attaining the customer satisfaction, retention, reliability, productivity, market share, profitability and survival, which are all directly affected by the quality of an organization's products, services and performance(Mohanty et. al. 1998) [14]. The intuition and judgment on the part of TQM practitioners, organization culture managerial leadership and contemporary business environment are some of the factors that normally affect an approach for adoption(R.L. Shrivastava et. al. 2006)[13]

Performance Measure quantitatively tells us something about our products, services and processes that produce them. They are a tool to help us understand, manage and improve what our organizations do. They also help us by providing information to take correct decisions. A performance consists of a number and a unit of measure. The number gives us a magnitude and unit gives it a meaning (M.B. Alia, 2011)[8]. Performance Measures are always tied to a goal. Performance Measures can be represented by single dimensional units like hours, meters, nanoseconds, dollars, no of errors etc. (M.D. Singh, 2006)[9].They can show variation in a process or deviation from design specification. Measures express these dimensions as ratios of two or more fundamental units. These may be units like miles per gallon (a performance measure of fuel economy), number of accidents per million hours worked (a performance measure of the company's safety program), number of one time vendor delivery per total no of vendor deliveries etc. (Nimawat Dheeraj et. al., 2012)[11]. Ideally, performance Measures should be expressed in units of measure that are most meaningful to those who must use or make decisions based on those measures.(S. Shrivastava et. al. 2014)[18].

Some of the major weaknesses of Indian manufacturing industries are: poor responsiveness to changing market scenario, poor quality, low productivity, less emphasis on safety parameters, poor cost responsiveness of production systems, improper organization structure, low skill & knowledge of employees, low production automation, unsupportive working environment, non-promotion of safe practices, high labour rigidity (P. Duxson et.al.2007) [12]

The present study critically examines the various factors which influence the operating & financial performance of manufacturing industries, taking Quality, Productivity & Safety together into account. Organizations and Individual need a methodology for improvement and problem solving. If the processes are not improved over a period of time, they deteriorate. Hence, there is a need to develop a model for improved organizational performances.

3. LITERATURE REVIEW

A rich literature review is available due to contributions from practitioners, academicians and researchers. Various acclaimed researchers have described ways and means by which, organization performance can be measured and evaluated. Many researchers have carried out significant research on performance measures that represent organizational excellence(Ahire et. al. 1996, Benson et. al. 1991) [17].

Untawale S.P.et.al. (2004) [16] carried out his work on Indian manufacturing industries &have listed three (3) Performance Measures for performance improvement. He has also developed a model for Quality and Productivity improvement in Indian Manufacturing Industries. Shrivastava S. et. al. (2014) [18] carried out his research on Indian cement industries & has Identified 6 (six) Performance Measures consisting of 38 attributes for attaining Quality management goals. Manisha Lande et. al. carried out her work for lean six sigma in Small and Medium enterprises and identified attributes for Performance Measures in her study for Indian industries. Minhaj A.A. Rehman et.al. (2015) carried

out his studies on Automobile industries. He identified various variables for Green Supply Chain Management in automobile industries in Maharashtra, India. Vinod S. Gorantiwar et.al. (2014) carried out his research in sponge iron industries for Quality-Productivity management and identified 34 attributes of prime consideration. Amol Lokande (2014) has carried out his studies on Indian industries with respect to remanufacturing industries. He identified 7 performance measure factors including 65 variables for establishment of Remanufacturing Industry in India. Tushar N. Desai[20] conducted his studies on six sigma, in the context of Indian Industry. He identified 8 performance measures contributing to 54 variables. He carried out exploratory research & identified attributes for Critical Success Factors for Quality and Productivity improvement with TQM management approach. R. l. Shrivastava et. al. also carried out their work in Indian industries to establish Linkages between Total Quality Management and Organizational Performance. They have identified 5 (five) organizational performance measurement in their study.

M.D. Singh et.al. (2006) [9] have proposed Knowledge Management involves strategies & processes of identifying, capturing &leveraging knowledge to enhance competitiveness. He collected data from 71 industries to access the impact KM practices in Indian manufacturing Industries. AleksanderJaneset.al.(2013) [2] have explored & clarified the cause & effect relations between key performance indicators, which significantly contribute to the benefits of the business processes exploitation.Ahujaet.al.(2008)[1]evaluated the challenges before Indian manufacturing organizations for adapting to proactive Total Preventive Maintenance initiatives. They formulated performance measures to overcome obstacles for implementation of TPM to face global challenge. Ayoob Ahmed Wali et.al.(2000) [3] conducted their research on Indian Software industries & presented economic context of liberalization & globalization. The Indian software industry has been recognized globally for its competitiveness built upon Quality attributes such as timeliness & reliability of delivery. Their case study work identifies performance measures for TQM. Wali et.al. classified performance measures in 6 categories. P. P. Shah et.al.[13]have done their pilot study in small and medium sized enterprises for identification of lean six sigma. They identified 7 performance measures for development of an SME-focused model for its possible use for implementing LSS.

Anderson et.al. (1999) [7] collected data from 62 small industries in Australia to examine relationship between the quality management practices & business performance. Terziovski et.al. (1999) [10]characterized the organizational performance by 14 attributes. Their findings show that TQM has a significantly positive effect on operational and business performance. Brah et. al.(2002) [15]attempted an empirical study to test the relationship between organizational performance and Quality parameters. Lavy et. al. (2010) identified four major indicators for performance measurement.

The above mentioned literature review on performance measures reveals a number of requirements identified by various researchers.

4. RESEARCH OBJECTIVES & METHODOLOGY

The basic objective of this study is to analyze performance measures for Quality, Productivity & Safety interrelationship in Indian Manufacturing Industries. An exploratory empirical investigation of cross sectional study of CSFs for different sizes of industries was carried out. The CSFs used in this study were derived from existing literature review of different types of industries. Also, an exhaustive study including number of surveys was carried out to determine various factors responsible for performance improvement in these industries. Using a comprehensive blend of the literature, six performance measures of Quality, Productivity and Safety interrelationship for Indian manufacturing

industries has been developed, which included 47 variables. A total of 6 performance measures along with their sub elements have been generated from literature review & field survey, and after doing Exploratory Factor Analysis.

A proposed CSF model has been suggested for performance improvement.

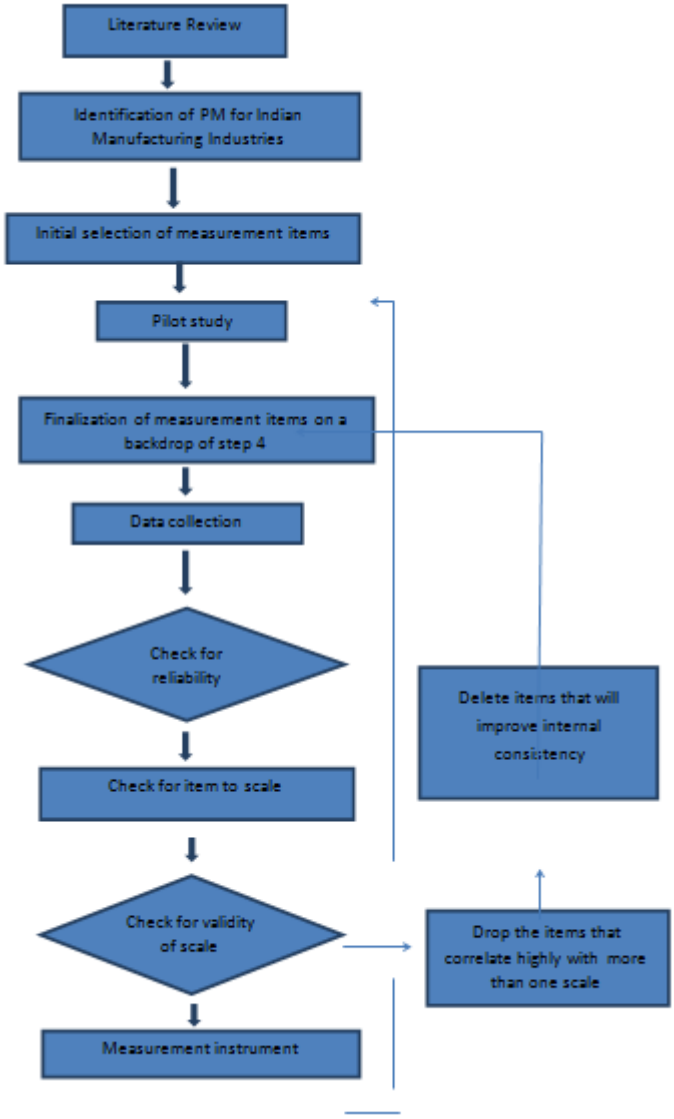

Figure 1: Proposed Flowchart for Deriving PM for Indian Manufacturing Industries

Table 1: List of PMs Along with their Variables that Influence Quality, Productivity & Safety in Manufacturing Industries

PM Identified	Attributes
Quality Performance	Extent of quality of relationships are improved, Defective materials properly identified, segregated from acceptable material and held in a controlled area pending disposition, Inspection and test equipment periodically inspected, Timely delivery of materials & supplies as ordered, Improvement in adoption of innovative technology and capacity utilization of industries, Decrease in delivery lead time, Strengthening of the reliability of products, Increase in reputation of organization, improved product quality at lower cost. Long term goal setting on the basis of current performance, Overall employee involvement in Quality improvement
Productivity Performance	Reduced variance in cycle times, Reduced idle time as a percent of total time, Increased labour efficiency rate, Decrease in down time due to process problems, Increase in production rate, Increase in total productivity factor, Optimum human resource utilization, High productivity of assets (machines, equipments etc.)
Financial Performance	Led to higher profitability, cost savings and competitiveness, Decrease in average production cost per unit, Increase in sales, Increase in Return on investment, Growth in market share, Results in Decreased scrap & Rework, Decreased re-inspection & retest cost, Decreased delay cost
Safety Performance	Increase in safety reputation of organization, Safety oriented programs result in reduction in risk behavior, Better safety results (no of days with no safety violations), Safety violations corrected within the allotted work framed, Decreased injuries / illness, Better Quality of work life, Improved working conditions & safety
Employee Satisfaction	Overall, information in the organization is communicated well, The organization listens to the ideas /opinions that employees contribute, Reward and recognition given to employees for suggestions regarding improvement, The environment in this organization supports a balance between work and personal life, The organization's policies for promotion and advancement are always fair, Fair Compensation cost is paid by the organization, Enhanced employee retention
Customer Satisfaction	Customer Feedback and Suggestions always welcome & entertained, Customer complaints dealt on priority, Customer communication system well established, Improved Customer Satisfaction, Price of the product in line with others, Enhanced Customer retention

5. METHODOLOGY AND ANALYSIS OF DATA

5.1. Data Source

Both primary as well as secondary sources are used for data collection. The primary source consists of collecting data from respondents through a well-structured questionnaire. The questionnaire was distributed to 450 respondents. The questionnaire clearly explains the objective of study. The questionnaire was designed systematically to collect the responses, which directly & indirectly focused on the research goals. It regulates the research investigations in the manufacturing industries.

5.2. Sampling Data Procedure

In the present work, a sample size of 450 was chosen for the final survey. The data collection through questionnaire method gives a very clear picture of study, but it is also associated with some disadvantages. Generally, there is low rate of return of filled questionnaires, or bias due to no response. Also, it gives good results when respondents are educated, understanding & cooperative. Many a times there are ambiguous replies or non-reply to few questions. Drawing interpretation to those questions which are not replied is very difficult. Once we distribute the questionnaire, there is no control over it. The method is very slow too.

Hence, to come out of the above disadvantages associated with the questionnaire method, the following care were taken to get good & quick response. Close friends and associates were identified in these research areas and questionnaire was explained to them. Generally, the respondents were given a call and a prior appointment was made so that they can give correct answers in their free time. Since the questionnaire is in English language, some respondents (like technicians) felt difficulty in understanding, so complete explanation of all questions was made. Few Questionnaires were mailed along with a prepaid envelop in order to facilitate quick reply. Respondents were followed up for responses by mails, messages or calls. Some of them were contacted personally also for a quick reply. Any difficulty associated with understanding any point of questionnaire was resolved during follow up procedure. The strict follow up procedures and support from friends and colleagues resulted in a response rate of 64.44%. The response rate is quite encouraging.

5.3. Reliability of Experimental Process

First of all, the entire data collected from respondents was checked for reliability. The software used for analysis is IBM SPSS version 20. Reliability was operational as internal consistency, which is the degree of inter correlation ship among the items comprising a scale. Reliability coefficient, cronbachα is used for checking the reliability of the data. Alpha is the average of the correlation coefficient of each item with every other item. The Questionnaire consists of total 47 variables under 6 factors. Cronbachα was found to be 0.743. The value suggests that instrument is reliable. Reliability of individual factors was also calculated. These values ranged from 0.51 to 0.658. Since the reliability coefficient of all the factors are above 0.5, it indicates the acceptable reliability.

After reliability, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity was conducted. The KMO value was found to be0.698, which is sufficiently large(> 0.5). It indicates the sample adequacy for carrying out further Factor Analysis. It supports the appropriateness of using factor analysis to explore the underlying attributes. The Bartlett's test of sphericity was highly significant ($p<0.000$). The significance value of Bartlett's test is 0.000, which rejects the null hypothesis that the attributes identified are uncorrelated in the population.

The collected data is analysed using factor analysis. Factor Analysis is a procedure generally used for data reduction and summarisation. In a research survey, since the number of variables are large, most of them may be correlated, which needs to be reduced to a manageable level for interpretation.

Table 2: Reliability Coefficient for Individual Factors

Factor No.	Factor Based on Survey	Cronbachα
Factor 1	**Quality Performance**	0.639
Factor 2	**Productivity Performance**	0.643
Factor 3	**Financial Performance**	0.658
Factor 4	**Safety Performance**	0.588
Factor 5	**Employee Satisfaction**	0.508
Factor 6	**Customer's Satisfaction**	0.631

5.4. Communalities

Communalities is referred to as percentage of total variance explained by common factors. Communalities refer to as the proportion of the variance in the original variables that is accounted for the factor solution (M.B. Alia et.al.2011) [10]. The factor solution should explain at least half of each original variable's variance, so the communality value for each variable should be 0.40 or higher. This term is measure of "uniqueness". A low communality figure indicates that the variable is statistically independent & cannot be combined with other variables. The values of communalities calculated for

different variables in our study are more than 0.5 hence we can conclude that the initial items selected for Quality, Productivity & Safety improvement are dependent with each other & focus on common issue.

Table 3: Communalities for CSF

S. No.	Attribute	Initial	Extraction
1	Extent of quality of relationships are improved,	1.0000	.565
2	Defective materials properly identified, segregated from acceptable material and held in a controlled area pending disposition	1.0000	.563
3	Inspection and test equipment periodically inspected	1.0000	.601
4	Timely delivery of materials & supplies as ordered	1.0000	.619
5	Improvement in adoption of innovative technology and capacity utilization of industries	1.0000	.559
6	Decrease in delivery lead time	1.0000	.705
7	Strengthening of the reliability of products	1.0000	.744
8	Increase in reputation of organization	1.0000	.744
9	improved product quality at lower cost	1.0000	.501
10	Long term goal setting on the basis of current performance	1.0000	.622
11	Overall employee involvement in Quality improvement	1.0000	.5
12	Reduced variance in cycle times	1.0000	.708
13	Reduced idle time as a percent of total time	1.0000	.704
14	Increased labour efficiency rate	1.0000	.594
15	Decrease in down time due to process problems	1.0000	.759
16	Increase in production rate	1.0000	.721
17	Increase in total productivity factor	1.0000	.746
18	Optimum human resource utilization	1.0000	.607
19	High productivity of assets (machines, equipments etc.)	1.0000	.650
20	Led to higher profitability, cost savings and competitiveness	1.0000	.706
21	Decrease in average production cost per unit	1.0000	.837
22	Increase in sales	1.0000	.695
23	Increase in Return on investment	1.0000	.837
24	Growth in market share	1.0000	.712
25	Results in Decreased scrap & Rework	1.0000	.681
26	Decreased reinspection & retest cost	1.0000	.831
27	Decreased delay cost	1.0000	.690
28	Increase in safety reputation of organization	1.0000	.714
29	Safety oriented programs result in reduction in risk behaviour	1.0000	.711
30	Better safety results (no of days with no safety violations)	1.0000	.653
31	Safety violations corrected within the allotted work framed	1.0000	.692
32	Decreased injuries / illness	1.0000	.614
33	Better Quality of work life	1.0000	.705
34	Improved working conditions & safety	1.0000	.668
35	Overall, information in the organization is communicated well.	1.0000	.634
36	The organization listens to the ideas /opinions that employees contribute.	1.0000	.557
37	Reward and recognition given to employees for suggestions regarding improvement	1.0000	.778
38	The environment in this organization supports a balance between work and personal life.	1.0000	.766
39	The organization's policies for promotion and advancement are always fair.	1.0000	.649
40	Fair Compensation cost is paid by the organization	1.0000	.697
41	Enhanced employee retention	1.0000	.745
42	Customer Feedback and Suggestions always welcome & entertained	1.0000	.958
43	Customer complaints dealt on priority	1.0000	.935
44	Customer communication system well established	1.0000	.959
45	Improved Customer Satisfaction	1.0000	.959
46	Price of the product in line with others	1.0000	.928
47	Enhanced Customer retention	1.0000	.955

Table 4: Rotated Component Matrix for PMs

Rotated Component Matrix[a]														
	Component													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Y0101	-.040	-.029	.675	-.063	-.047	-.137	.092	.027	.139	.017	.163	-.097	-.034	-.124
Y0102	.015	-.158	.664	-.076	.051	-.141	.023	.010	-.115	-.006	.037	-.086	.207	-.057
Y0103	.044	.047	.746	-.017	-.010	.050	-.063	-.102	-.104	-.059	.010	.051	.074	.023
Y0104	-.045	.496	-.061	.182	.066	.054	.013	-.025	.125	-.119	.236	-.045	.486	-.037
Y0105	.077	.082	.650	.038	.038	.080	-.054	-.101	.066	.013	.158	-.145	-.225	-.003
Y0106	.134	.151	-.018	.063	.049	.745	.039	.025	-.077	.053	-.069	.052	.252	.144
Y0107	.159	.038	.011	-.010	-.021	.836	.035	-.073	.035	-.071	.059	-.034	.003	.012
Y0108	.127	.067	-.075	.014	-.126	.815	.117	.010	.028	-.016	-.034	-.030	-.055	-.130
Y0109	.016	.080	.620	-.101	-.046	-.032	-.032	-.002	.137	-.012	.241	-.006	-.136	.028
Y0110	.019	-.008	.476	-.007	.015	.070	.026	.011	-.049	.054	.615	.058	.044	.016
Y0111	-.098	.012	.663	-.058	.023	.035	-.022	-.057	-.061	.029	-.109	.064	.021	.119
Y0201	.007	-.045	.070	.191	.015	.044	.056	-.019	-.013	.045	.781	.108	.127	.139
Y0202	.094	.312	.043	.264	-.019	.101	.061	-.013	.137	-.010	.067	.002	.699	-.033
Y0203	-.017	.018	.144	.084	.104	-.113	-.052	.026	-.020	-.099	.725	-.013	.007	.056
Y0204	.074	-.072	-.102	.823	.042	-.095	.070	.012	.022	-.008	.045	-.006	.186	.091
Y0205	.034	.151	.004	.803	-.014	.043	-.076	.063	.020	-.028	.086	.089	.125	.090
Y0206	.014	.374	-.055	.121	-.067	.069	.048	-.044	.038	.009	.065	-.055	.752	-.009
Y0207	.596	.091	-.112	.075	-.034	.229	.392	-.063	-.024	.041	-.092	-.039	.034	.022
Y0208	.710	.086	-.080	.084	.031	.215	.242	-.017	-.045	-.010	.067	-.052	-.029	-.094
Y0301	.103	.043	-.016	-.012	.043	.127	.808	-.044	-.006	-.043	.084	-.033	-.066	.077
Y0302	.300	.085	-.036	.083	.061	.058	.834	.021	.023	-.009	-.029	-.015	.083	.141
Y0303	.480	.080	.039	.136	.060	-.056	.607	.042	-.037	-.025	-.072	.102	.208	-.026
Y0304	.016	.082	-.073	.887	-.025	-.012	.023	-.002	.086	.036	-.025	.024	.166	.005
Y0305	.040	.787	-.002	.019	.144	-.005	-.041	.013	.062	-.034	.227	-.070	.013	.079
Y0306	.079	.777	.001	-.025	-.007	.053	.015	.003	-.005	.059	-.121	-.027	.220	.010
Y0307	.122	.873	.048	.041	.042	.095	.023	-.018	-.015	-.001	-.060	.051	.174	-.034
Y0308	.810	.033	.021	-.059	.021	.072	-.009	.009	.013	-.109	.041	-.042	-.078	-.025
Y0401	.048	.772	.025	.150	.050	.097	.216	.014	-.006	-.019	-.119	.093	.073	-.070
Y0402	.825	.048	-.023	.085	.027	.090	-.007	-.018	.017	-.018	-.040	.014	.042	-.084
Y0403	.734	.071	.123	-.004	-.033	.036	.180	.037	-.014	.129	.027	.063	.109	.155
Y0404	-.061	.047	-.056	-.029	.788	-.082	.061	.016	-.027	.028	.077	.095	-.077	.165
Y0405	-.028	.069	.060	-.109	.734	.106	-.172	-.007	-.044	.048	.018	-.004	-.038	.086
Y0406	.829	-.009	.009	-.029	-.039	-.019	.054	.010	-.052	.043	-.010	.050	-.002	.069
Y0407	.098	.013	.072	.115	.767	-.069	.063	-.078	.071	-.153	-.018	.048	.067	-.019
Y0501	-.006	.087	-.072	.028	.728	-.065	.188	.038	.045	.032	.065	-.062	.009	-.196
Y0502	-.007	.069	-.105	.661	-.002	.136	.142	.007	.003	-.028	.197	-.053	-.145	.042
Y0503	.008	-.048	-.075	.035	.002	.057	-.040	.868	-.082	.011	.044	.005	.000	.031
Y0504	.039	-.036	-.038	.010	-.092	.013	-.062	.858	-.057	-.069	.051	-.017	-.024	-.035
Y0505	-.047	.082	-.080	.023	.059	-.114	.083	.774	.045	.033	-.080	.003	-.017	.024
Y0506	.035	.043	.016	.102	.048	.076	.112	-.014	-.088	-.088	.295	-.078	.009	.744
Y0507	-.008	-.055	.002	.108	.010	-.059	.076	.032	.011	.027	-.019	-.003	-.043	.847
Y0601	-.039	.038	-.014	.053	.054	.002	-.014	-.051	.968	.036	-.030	.011	.079	-.027
Y0602	.029	.005	-.070	.034	.031	.019	-.013	-.015	.028	.014	.046	.959	-.033	-.058
Y0603	.018	-.006	-.009	-.006	-.024	-.036	-.030	-.001	.019	.977	-.012	.014	-.012	-.013
Y0604	-.045	.029	.016	.070	-.013	-.001	.004	-.046	.969	.042	-.027	.040	.070	-.038
Y0605	.004	.014	-.058	.018	.044	-.041	.004	.005	.022	-.009	.063	.957	-.015	-.008
Y0606	.013	-.015	.003	-.016	-.010	-.007	-.025	-.025	.057	.973	-.024	-.008	-.018	-.030
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.														
a. Rotation converged in 7 iterations.														

Interpretation of Performance Measures& its Attributes

To measure PMs of Quality, Productivity & Safety interrelationship in manufacturing industries the following main factors are considered.

FACTOR 1

This factor is known as **Quality Performance**. After rotated component matrix variable 4, 10has been excluded i.e. Timely delivery of materials & supplies as ordered and Long term goal setting on the basis of current performance. It includes the following variables: Extent of quality of relationships are improved, Defective materials properly identified, segregated from acceptable material and held in a controlled area pending disposition, Inspection and test equipment periodically inspected, Improvement in adoption of innovative technology and capacity utilization of industries, Decrease in delivery lead time, Strengthening of the reliability of products, Increase in reputation of organization, improved product quality at lower cost, Overall employee involvement in Quality improvement.

FACTOR 2

This factor is termed as **Productivity Performance.** Here none of the variables are excluded. Hence all the attributes are accepted i.e**.** Reduced variance in cycle times, Reduced idle time as a percent of total time, Increased labour efficiency rate, Decrease in down time due to process problems, Increase in production rate, Increase in total productivity factor, Optimum human resource utilization, High productivity of assets (machines, equipments etc.)

FACTOR 3

This factor is being named as **Financial Performance.** After analysis variables 3, 4 and 8 have been excluded. These variables are: Decrease in average production cost per unit, Increase in sales, Decreased delay cost. Hence, the accepted attributes are: higher profitability, cost savings and competitiveness, Increase in Return on investment, Growth in market share, Results in Decreased scrap & Rework, Decreased reinspection & retest cost,

FACTOR 4

This factor is named as **Safety performance**. Here total four variables viz. 1, 2,3 and 6 has been excluded. The excluded variables are increase in safety reputation of organization, Safety oriented programs result in reduction in risk behaviour, Better safety results (no of days with no safety violations), Better Quality of work life. The accepted attributes in this factor are: Safety violations corrected within the allotted work framed, Decreased injuries / illness, improved working conditions & safety.

FACTOR 5

This factor is termed as **Employee Satisfaction.** The variables no. 1 and 2 have been excluded and they are over all, information in the organization is communicated well and the organization listens to the ideas/opinions that employees contribute. Rest 5 variables have been considered namely, Reward and recognition given to employees for suggestions regarding improvement, The environment in this organization supports a balance between work and personal life, The organization's policies for promotion and advancement are always fair, Fair Compensation cost is paid by the organization and Enhanced employee retention.

FACTOR 6

The last PM factor is **Customer Satisfaction.** Here, all the variables are accepted and they are, Customer Feedback and Suggestions always welcome& entertained, Customer complaints dealt on priority, Customer communication system well established, Improved Customer Satisfaction, Price of the product in line with others and Enhanced Customer retention

6. CONCLUSIONS

The various factors for Quality, Productivity and Safety improvement proposed by different authors were organized into a set of six performance measures. Total 47 attributes are being considered under 6 factors. Performance measures and their variables have been identified from the literature on various aspects of Quality, Productivity and Safety for improving overall performance of the organization. These factors and their variables have been tested for their reliability and validity by using SPSS20. The performance variables suggested are ***Quality Performance, Productivity Performance, Financial Performance, Safety performance, Employee Satisfaction and Customer Satisfaction.*** These performance measures are expected to act as gauging measures of success factor of various organizations.

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